**AMENDMENTS TO THE CLAIMS**

1. – 54. (Cancelled)

55. (Previously Presented) A microfluidic system comprising a substrate, wherein the substrate comprises at least one measurement chamber for containing one or more cells or lipid based cell structures, the measurement chamber comprising at least one raised aperture for detecting an electrical property of one or more cells or lipid based cell structures, each aperture comprising a tip, the tip comprising a housing defining a lumen, wherein at least one tip is inserted into a cell or lipid based cell structure, and wherein the substrate further comprises at least one microchannel with at least one inlet and at least one outlet which opens into the at least one measurement chamber, and wherein the at least one microchannel delivers one or more substantially separate aqueous streams into the measurement chamber.

56. (Original) The microfluidic system according to claim 55, wherein at least one of the at least one measurement chambers is circular and a plurality of microchannels are radially disposed about the chamber and comprise outlets that open into the chamber.

57. (Original) The microfluidic system according to claim 55, wherein the aperture comprises a lumen for receiving a conducting medium.

58. (Previously Presented) The microfluidic system according to claim 57, wherein the conducting medium is a liquid conducting medium.

59. (Previously Presented) The microfluidic system according to claim 58, wherein the liquid conducting medium comprises an electrolyte solution, or an electrically conducting polymer.

60. (Previously Presented) A microfluidic system comprising a substrate, wherein the substrate comprises at least one measurement chamber for containing one or more

cells or lipid based cell structures, the measurement chamber comprising a plurality of solid electrode tips for detecting an electrical property of one or more cells or lipid based cell structures, the tips comprising a housing defining a lumen, where the housing comprises a solid state conducting material, wherein at least one tip is inserted into a cell or lipid based cell structure, and wherein the substrate further comprises at least one microchannel with at least one inlet and at least one outlet which opens into the at least one measurement chamber, and wherein the at least one microchannel delivers one or more substantially separate aqueous streams into the measurement chamber.

61. (Previously Presented) The system according to claim 55 or 60, wherein the at least one tip is tapered to facilitate insertion into a cell or cell structure.

62. (Original) The system according to claim 55 or 60, wherein at least one tip comprises a contacting surface for contacting biological molecules or macromolecules and wherein the contacting surface comprises a hydrophilic material.

63. (Cancelled)

64. (Original) The system according to claim 62, wherein at least one contacting surface comprises a diameter of less than about 5 μm.

65. (Original) The system according to claim 62, wherein at least one contacting surface comprises a diameter of less than about 1 μm.

66. (Cancelled)

67. (Previously Presented) The system according to claim 55 or 60, further comprising a pressure control device for controlling positive and negative pressure applied to at least one microchannel.

68. – 70. (Cancelled)

71. (Previously Presented) The system according to claim 55 or 60, wherein the substrate is interfaced to a multiwell plate through one or more external tubings or capillaries.

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79. (Previously Presented) The system according to claim 60 or 65, further comprising a processor in communication with a scanning mechanism.

80. (Cancelled)

81. (Previously Presented) The system according to claim 79, wherein the processor controls one or more of: the rate of scanning, the direction of scanning, acceleration of scanning, and number of scans.

82. (Cancelled)

83. (Previously Presented) The system according to claim 55 or 60, further comprising an amplifier in communication with the at least one electrode.

84. (Cancelled)

85. (Previously Presented) The system according to claim 81, wherein in response to a signal from a detector, the processor alters one or more of the rate of scanning, the direction of scanning, acceleration of scanning, and number of scans.

86. (Cancelled)

87. (Original) The system according to claim 81, further comprising a user device in communication with the processor, the user device comprising a graphical user display for interfacing with a user.

88. (Cancelled)

89. (Previously Presented) The system according to claim 55 or 60, further comprising a plurality of buffer delivery and agonist delivery channels, each channel comprising an outlet for delivering a substantially separate aqueous stream into the chamber.

90. (Currently Amended) The system according to claim 55 or 60, further comprising a scanning mechanism, wherein the cell or lipid based structure is mechanically scanned across stationary microchannel outlets, wherein the microchannel outlets are mechanically scanned relative to a stationary cell or lipid based structure, or wherein a fluid stream is scanned across an immobilized cell or lipid based structure~~scanning a cell across the aqueous streams from the channels~~.

91. (Previously Presented) The system according to claim 55 or 60, wherein at least one microchannel delivers at least one agent into the measurement chamber.

92. – 102. (Cancelled)

103. (Previously Presented) The method of claim 55 or 60, wherein the electrical property is a transmembrane current.

104. (Previously Presented) The method of claim 55, wherein the at least one raised aperture extends from a substantially planar portion of the measurement chamber.

105. (Previously Presented) The method of claim 60, wherein the plurality of solid electrode tips extends from a substantially planar portion of the measurement chamber.

106. (New) The system according to claim 90, wherein the fluid stream is scanned across an immobilized cell by controlled variation of the pressure across, and flow rates through, each microchannel.